



US DEPARTMENT OF DEFENSE

## BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

# Health Outcomes Following Extremity Trauma

## Five-Year Health Outcomes Following Upper Limb Combat Amputations

Service Members who sustained combat amputations to the upper limbs in the Iraq and Afghanistan conflicts present new challenges for military and Department of Veteran Affairs (VA) providers. Approximately 90 percent of these amputations were caused by blast injuries. Little research has tracked their health outcomes beyond the short-term due to the difficulty of integrating military and VA health data. This study, funded by the Extremity Trauma and Amputation Center of Excellence (EACE), described the physical and psychological outcomes for US Service Members during the first five years following upper limb amputations sustained in Iraq and Afghanistan, 2001–2008. Researchers compared clinical diagnoses for patients with upper limb amputations to individuals with serious upper limb injuries without amputation. Researchers at the Naval Health Research Center (NHRC), Naval Medical Center San Diego (NMCS), and San Diego VA—with funding from the Navy Bureau of Medicine and Surgery (BUMED) Wounded, Ill, and Injured (WII) Program—identified study patients and injury-specific data in NHRC’s Expeditionary Medical Encounter Database (EMED). The study team conducted a retrospective review of military and VA health databases for patients who sustained unilateral upper limb amputation ( $n = 141$ ) or serious upper limb injury without amputation ( $n = 85$ ) in the Iraq and Afghanistan conflicts, 2001–2008. Military and VA health diagnoses were followed for five years post-injury for all patients. Patients with above elbow (AE) amputations had significantly higher ISS than patients with below elbow amputations (BE) or no amputation. The AE group had significantly higher prevalence of anemia, PE, osteomyelitis, and eye disorders compared with BE amputation patients and/or upper limb injury without amputation. By contrast, neuroma was significantly more likely following BE than AE amputation or no amputation. The prevalence of heterotopic ossification (HO) was 11–21 percent and highest following AE amputation. All groups had similar relatively high incidence of lumbago and/or limb pain (40–60 percent), hypertension (15–20 percent), and obesity diagnoses (12–19 percent). The five-year incidence of osteoarthritis ranged between 8 percent and 15 percent with no significant differences between groups. Nearly 90 percent of all groups had at least one psychological disorder. The prevalence of posttraumatic stress disorder (PTSD) increased significantly after the first year for the amputation groups, while diagnoses of mood, anxiety, and adjustment disorders declined over the first five years post-injury for all groups. This is one of the first studies to integrate military and VA health records for five years after combat amputations to the upper limbs. It is also one of the first to describe how physical and mental health outcomes following upper limb amputation may be unique by comparison to patients with serious upper extremity injury without amputation. These results can help refine existing treatment strategies to prevent early wound complications and other physical and psychological health complications. The results can also guide development of post-injury treatment pathways for patients with upper limb amputation versus other serious upper extremity trauma.

